

THE MINERAL INDUSTRY OF

NEW ZEALAND

By Travis Q. Lyday

Mining activities in New Zealand include coal extraction by underground and open pit methods; gold and titaniferous magnetite sand (iron sand) mining; and quarrying of raw materials for use primarily in the domestic construction (clays, sand and gravel, and stone) and agricultural (limestone and marble) industries. Natural gas, natural gas liquids, and crude petroleum also is produced.

The extractive minerals industry (rock and minerals; coal; natural gas and petroleum) in New Zealand constitutes only a small segment of the economy, contributing on the order of 3% to the gross domestic product (GDP) of the country. The mineral processing sector, consisting chiefly of the production of primary aluminum, concrete, manufactured fertilizer, refined petroleum products, and crude steel produced mostly from imported raw materials, provided an estimated 4% to the GDP, increasing the value of the country's mineral industry to about 7% of the GDP.

During the year, gold was produced from three large hard-rock mining operations, the Golden Cross and Martha Hill operations near Waihi at the base of the Coromandel Peninsula and the Macraes Mine in the Eastern Otago region of South Island. Alluvial mining took place at several medium- and numerous small-sized alluvial sites, especially on South Island. Iron sand was mined at two sites on North Island, Waikato-North Head and Taharoa. Coal was produced from mines on North Island and South Island.

New Zealand's mining industry is regulated by legislation passed in 1991 by Parliament, namely the Crown Minerals Act and the Resource Management Act. The former prescribes the granting of prospecting, exploration, and mining permits for Crown minerals, ensuring that the Government receives a return when the mineral resources are developed. The latter applies to all industries, focusing on the effects of any activity on the environment.

The Crown Minerals Amendment Act (No. 2) was enacted by Parliament on November 26, 1997. It was originally introduced in 1990 as the Protected Areas (Prohibition on Mining) Bill, known as the PAPOM Bill. Under this Act, access is severely restricted in the following areas: national parks; wilderness areas; nature reserves; marine reserves; scientific reserves; wildlife sanctuaries; forest sanctuaries; wetlands as notified to the Bureau of the Convention on Wetlands of International Importance; islands in the Hauraki Gulf administered by the Department of Conservation, but not including Red Mercury Island, Green Island, Middle Island, and Korapuki Island; ecological areas in the Coromandel Forest National Park; conservation land on part of the Coromandel Peninsula; and internal waters of the Coromandel Peninsula. Any existing mineral licenses and permits will continue until their expiration dates when, in most cases, access will not be renewed. The Act does not include land leased to the Crown, i.e., Government, or land gifted to the Crown by Hauraki iwi where the mineral rights have been retained by the iwi. It also has a provision that enables areas of conservation either to be added or removed from the areas closed to mining, with public

consultation (New Zealand Mining, 1998a).

Coeur Gold New Zealand Ltd. closed its Golden Cross Mine in the Waitekauri Valley in December. Coeur Gold, the mine operator, held an 80% interest and Viking Mining Ltd. held the remaining 20%. Coeur Gold is a wholly owned subsidiary of Coeur d'Alene Mines Corp. of the United States and Viking is a subsidiary of New Zealand's Todd Corp. A staff of 35 remain at the operation to oversee the rehabilitation program. It is proposed that the tailings dam will not be capped as part of the rehabilitation process but will be developed as a wetland lake with the surface water able to flow across it. The company also is proposing that the tailings dam and open pit be fenced off and, in the long term, the open pit be backfilled. The buildings and processing facilities will be dismantled and taken off site (New Zealand Mining, 1998b).

Titanomagnetite-bearing iron sand is mined and concentrated at two unique projects along the western coast of North Island by New Zealand Steel Ltd. (NZ Steel), a wholly owned subsidiary of Australia's BHP Steel Mining Ltd. Titanomagnetite concentrate is produced by dry-mining (bulldozing and bucketwheel excavation) methods at Waikato-North Head, about 50 kilometers (km) south of Auckland, and pumped as a slurry through an 18-km pipeline to NZ Steel's integrated Glenbrook Steelworks. NZ Steel uses wet-(suction dredging) and dry-mining methods to produce an iron sand concentrate at its Taharoa project, about 100 km farther south. The Taharoa concentrate, averaging about 40% titanomagnetite by weight, is exported exclusively to Japan in specially fitted slurry ore carriers loaded at a mooring buoy connected to shore by a 3-km slurry pipeline. The product is used as a steelmaking additive and as a refractory in blast furnace operations. The existence of these iron sand deposits has been known for more than a century. But only in the late 1960's, when the economic recovery of their iron content by direct reduction was established by NZ Steel, were they usable in steelmaking. The steelmaking industry in New Zealand was established with the completion of NZ Steel's Glenbrook steelworks in 1970.

Coal is produced from about 60 mines in more than 40 separate coalfields on North Island and South Island. The estimated resource of almost 9 billion tons of potentially recoverable coal is 82% lignite, mainly in Southland and Otago on South Island; 14% subbituminous, mainly in Waikato, North Island; and slightly less than 4% high-value bituminous coal, mainly in Westland, South Island. Production is dominated by Solid Energy New Zealand, a state-owned enterprise operated on a competitive, commercial basis (International Bulk Journal, 1997).

The Maui gas-condensate field off the coast of North Island is the country's largest, supplying about one-third of the country's total energy needs. Gas production from the Maui operation is piped to the onshore Oaonui gas treatment plant where it is sold to the Crown Government under a long-term contract effective until 2009. The

Government, in turn, sells the gas to the Electricity Corp. of New Zealand, which burns a substantial amount in the generation of electricity; Methanex NZ Ltd., which owns the synthetic gasoline and methanol manufacturing plants; and the Natural Gas Corp. Ltd., which operates the wholesale natural gas distribution system. These interests each receive about one-third of Maui's gas production. Condensate production also is piped to the Oaonui plant, where it is stabilized before shipment to Port Taranaki for export to Australian refineries.

New Zealand's downstream mineral industry consists of two steel mills; an aluminum smelter; aluminum, copper, and brass extrusion plants; and an oil refinery, all of which primarily use imported raw materials. There are also three cement companies, each with a single plant.

References Cited

- International Bulk Journal, 1997, International report—New Zealand: International Bulk Journal, February, v. 17, p. 35-37.
New Zealand Mining, 1998a, Crown Minerals Amendment Act (No. 2): New Zealand Mining, 1998, v. 23, p. 9.
———1998b, Golden Cross closes: New Zealand Mining, January, v. 23, p. 9.

Major Sources of Information

Energy Efficiency and Conservation Authority
33 Bowen St.

Commerce Building
P.O. Box 388
Wellington, New Zealand
Telephone: +64 4 474 2870
Fax: +64 4 499 5330
E-mail: geoffk@moc.govt.nz

International Geothermal Association
c/o Institute of Geological and Nuclear Sciences
Wairakei Research Centre, Private Bag 2000
Taupo, New Zealand
Telephone: +64 7 374 8211
Fax: +64 7 374 8199
E-mail: igasci@gns.cri.nz
URL: <http://www.demon.co.uk/geosci/igahome.html>

Ministry of Commerce, Energy and Resources Division
P.O. Box 1473
Wellington, New Zealand
Telephone: +64 4 474 2876
Fax: +64 4 473 9930

New Zealand Minerals Industry Association
P.O. Box 27314
Wellington, New Zealand
Telephone: +64 6 385 1141
Fax: +64 6 385 1155

TABLE 1
NEW ZEALAND: PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity	1993	1994	1995	1996	1997 e/
METALS					
Aluminum metal, smelter:					
Primary	277,400	269,100 r/	273,296	284,667 r/	305,000 2/
Secondary e/	6,700	6,700	8,200	8,300	8,000
Total e/	284,100	275,800 r/	281,496	292,967 r/	313,000
Gold, mine output, Au content kilograms	11,161	10,118	12,132	11,571 r/	11,500
Iron and steel:					
Iron sand (titaniferous magnetite):					
Gross weight thousand tons	2,389	2,080	2,362	2,334 r/	2,300
Pig iron do.	653	563	631	650 e/	534 2/
Steel, crude do.	853	766	842 r/	808 r/	758 2/
Lead, refinery output, secondary e/	3,000	6,000	6,000	6,000	6,000
Silver, mine output, Ag content kilograms	25,797	27,589	27,794	29,340 r/	30,000
INDUSTRIAL MINERALS					
Cement, hydraulic e/ thousand tons	800	900 r/	950 r/	974 r/	976
Clays:					
Bentonite	1,613	930	3,699	13,734 r/	14,000
Kaolin (pottery)	26,543	40,720	13,662	26,325 r/	26,000
For brick and tile	130,004	79,080	38,382	27,159 r/	27,000
Diatomaceous earth 3/	XX	XX	XX	16	20
Lime e/	100,000	100,000	100,000	100,000	100,000
Marble 4/	XX	XX	1,139	1,500	1,500
Nitrogen, N content of ammonia	77,800	81,400 r/	79,200 r/	69,700 r/	79,600
Perlite 5/	814	--	1,800	1,880 r/	1,900
Pumice	69,179	116,840	77,054	90,571 r/	90,000
Salt e/	80,000	80,000	50,000	67,000 r/	67,000
Sand and gravel:					
Silica sand (glass sand)	48,635	37,611	31,052	23,867 r/	25,000
Other industrial sand	671,212	323,083	627,671	508,950 r/	510,000
For roads and ballast thousand tons	13,502	10,863	16,100	15,274 r/	15,000
For building aggregate do.	4,942	5,219	5,126 r/	5,395 r/	5,300
Stone:					
Dolomite 6/	9,671	12,939	14,212	XX	XX
Limestone and marl:					
For agriculture thousand tons	1,689	1,564	1,300	1,457 r/	1,500
For cement do.	1,577	1,542	1,543	1,520 r/	1,500
For other industrial uses do.	379	355	387	461 r/	450
For roads 7/ do.	597	600 e/	600 e/	530 r/	550
Serpentine do.	22,386	8,680	19,308	15,714 r/	15,000
Dimension	40,060	18,615	25,080	27,242 r/	25,000
Rock for harbor work thousand tons	1,680	1,075	1,327	1,500 e/	1,500
Sulfur	6,600	2,102	--	--	--
MINERAL FUELS AND RELATED MATERIALS					
Carbon dioxide, liquefied e/	10,000	10,000	10,000	10,000	10,000
Coal:					
Bituminous thousand tons	975	1,265	1,570	1,300 r/	1,500
Subbituminous do.	1,932	1,516	1,632	1,500 e/	1,500
Lignite do.	184	252	243	259 r/	250
Total do.	3,091	3,033	3,445	3,059 r/	3,250
Coke: e/					
Coke oven	1,000	1,000	1,000	1,000	1,000
Gashouse	7,000	7,000	8,000	8,000	8,000
Total	8,000	8,000	9,000	9,000	9,000
Gas: e/					
Manufactured (from gasworks) thousand cubic meters	11,350	11,350	11,500	11,500	11,500
Natural:					
Gross production 2/ million cubic meters	6,030	4,800 r/	4,900 r/	4,800 r/	4,800
Marketed production do.	4,900 2/	3,900 r/	4,000 r/	3,900 r/	3,900

See footnotes at end of table.

TABLE 1--Continued
NEW ZEALAND: PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity	1993	1994	1995	1996	1997 e/
MINERAL FUELS AND RELATED MATERIALS--Continued					
Natural gas liquids: e/					
Liquefied petroleum gas thousand 42-gallon barrels	1,500	1,500	1,500	1,500	1,500
Natural gasoline do.	500	500	500	500	500
Total do.	2,000	2,000	2,000	2,000	2,000
Peat	101,476	115,488	107,703	109,982 r/	110,000
Crude thousand 42-gallon barrels	14,965	14,235 r/	11,880 r/	16,790 r/	25,550 2/
Refinery products: e/					
Gasoline do.	14,000	14,000	13,505 r/	14,000	14,000
Distillate fuel oil do.	10,500	11,000	11,680 r/	12,000	11,000
Residual fuel oil do.	2,500	3,000	2,555 r/	2,500	3,000
Other do.	3,000	3,000	2,920 r/	3,000	3,000
Refinery fuel and losses do.	2,000	2,000	(8/)	2,000	2,000
Total do.	32,000	33,000	30,660 r/	33,500	33,000

e/ Estimated. r/ Revised. XX Not applicable.

1/ Table includes data available through May 6, 1998.

2/ Reported figure.

3/ Not delineated prior to 1996.

4/ Not delineated prior to 1995.

5/ Includes zeolite beginning in 1995.

6/ Not delineated after 1995.

7/ Includes dolomite beginning in 1996.

8/ Refinery and fuel losses for 1995, 1,825 thousand 42-gallon barrels, are included in the output of the individual petroleum products.